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Response to a recent editorial in the New York Times by Lawrence M. Wein

A recent editorial in the New York Times by Lawrence M.Wein (June 14, 2009) and subsequent discussion (June 21, 2009) highlights the need for a robust worldwide nuclear detection system. Wein suggests that detection resources should be spread across possible routes of entry in a way that provides uniform detection probabilities or all potential routes of entry.

This argument assumes that the detection probability is stochastic-that is that the probability of detection is independent of shielding or other concealment methods. An example where this is not true is the portal monitor system deployed at border crossings. Portal monitors will not detect a well shielded nuclear weapon. This obvious deficiency for detecting a shielded enriched uranium bomb might make personal vehicles entering at the Mexican or Canadian border the deliver system of least risk and cost for smuggling a terrorist nuclear weapon into the US.

The domestic Nuclear Detection Office has deployed a system of x-ray radiography and radiation detectors for examining cargo containers. This system flattens the detection probability across various scenarios. Heavily shielded objects can be detected by radiography and lightly shielded objects can be detected by the radiation monitoring. This solution is not possible for occupied vehicles because of the large radiation dose needed to penetrate the range of cargo that cross the border.

Cosmic ray muon tomography, a method invented at Los Alamos National Laboratory, provides a method for detecting shielded threats radiographically with no radiation dose to vehicle occupants. This technique has been shown to provide detection in times that are less than 60 seconds. The combination of muon tomography with passive radiation detection would increase the detection probability for shielded threats and would increase the detection probability for shielded nuclear threats transported into the country in occupied vehicles.

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